a2

10. (new) The method of claim 1, wherein a reaction product of said reaction is intercalated in the clay galleries.

REMARKS/ARGUMENTS

Claims 1 to 5 were pending in this application prior to this amendment. Claims 1 to 5 were rejected in the Office Action. Applicant has amended claims 1 and 2 and added new claims 6 to 10. No new matter has been introduced. Reconsideration of claims 1 to 5 and allowance of claims 1 to 10 is hereby respectfully requested.

Claim Rejections - 35 U.S.C. § 102

1. In the Office Action, the Examiner rejected claims 1-5 under 35 U.S.C. 102(b) as being anticipated by Hudson et al. (3796263).

Hudson discloses a method of treating underground formations, especially those containing clays, to render said clays insensitive to fresh water. According to the Hudson method, the clay-containing formations may be first coated with an extremely thin coating of a phenol-formaldehyde resin (col.4, l. 44-45). If such a resin coating is carried out, a solution containing a coupling agent and a catalyst is first injected into the formation (col. 6, l. 19-20). Next, the partially polymerized phenol-formaldehyde mixture is introduced into the formation (col. 6, l. 24-26).

The coupling agent comprises one functional group, which reacts with the phenol-formaldehyde, and one functional group, which reacts with the clay (col. 4, l. 59-64). The coupling agent forms a tenacious bond with the surface of

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the clay. When phenol-formaldehyde is subsequently added, it reacts with the coupling agent already coupled to the clay.

Hudson does not disclose the injection of a fluid containing both the phenol-formaldehyde and the coupling agent. Hudson only teaches the formation of a coating. It does not teach any intercalation of the phenol-formaldehyde or the coupling agent into galleries of the clay. In fact, it is not even taught that the coating permits stabilization of the clay.

Therefore, the Applicants respectfully submit that Hudson does not teach or even suggest at least the following underlined features of the invention claimed in claim 1 as amended:

> ...injecting from a surface reservoir a fluid comprising a first and a second reactant; letting said fluid contact said clayey formation; and stabilizing said formation by intercalation of the first reactant into galleries of said clayey geological formation and by using a reaction between said first and said second reactant...

and that the invention claimed in claim 1 is not anticipated by Hudson.

Claims 2 to 5 depend on claim 1 and are therefore not anticipated by Hudson at least for the same reasons as stated with respect to claim 1.

2. In the Office Action, the Examiner rejected claims 1-4 under 35 U.S.C. 102(b) as being anticipated by Meyer et al. (4307980).

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Meyer teaches a method of stabilizing coal present in coal formations using a composition of water glass, i.e. a composition of sodium and/or potassium silicate (col. 3, l. 11-12), polyisocyanates and possibly polyols, said composition forming an emulsion. The Meyer composition is able to harden, hence stabilizing coal formations.

Meyer does not teach that clayey geological formations surrounding a hydrocarbon well are stabilized. It does not teach any intercalation of a reactant into galleries of a clayey formation. It does not teach that the reaction is essentially initiated in the presence of clayey material.

Therefore, the invention claimed in claim 1 is not anticipated by Meyer.

Claims 2 to 4, which depend on claim 1, are not anticipated by Meyer at least for the same reasons as stated with respect to claim 1.

3. In the Office Action, the Examiner rejected claims 1, 2 and 5 under 35 U.S.C. 102(b) as being anticipated by Kubena, Jr. et al. (5211250).

Kubena discloses a method of stabilizing a wellbore and, in particular, shale zones of a wellbore by using an additive comprising a water-based drilling fluid comprising a water-soluble polymer of a relatively high molecular weight and a Bronsted-Lowry base, i.e. a substance that can accept a proton. In the presence of the base, the pH of the drilling fluid comprising the polymer will raise up to 9 or above and, at such pH, nucleophilic sites of the polymer will be formed, and stabilizing of the shale zones of the formation occurs.

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The base raises the pH of the drilling fluid independently of the presence of the polymer and the shale. At a pH equal to 9 or above, the nucleophilic sites of the polymer are able to react with the shale. No intercalation of the polymer in shale galleries is disclosed. No reaction between reactants is disclosed as well and certainly not a reaction initiated essentially in the presence of clay. In addition, Kubena does not teach any intercalation of a reactant into galleries of a clayey formation.

Therefore, the invention claimed in claim 1 is not anticipated by Kubena.

Claims 2 and 5, which depend on claim 1, are not anticipated by Kubena at least for the same reasons as stated with respect to claim 1.

4. In the Office Action, the Examiner rejected claims 1, 2 and 5 under 35 U.S.C. 102(b) as being anticipated by Hewgill et al. (4787453).

Hewgill teaches a method of stabilizing a fines-containing formation using a composition comprising organosilicons. Organosilicons hydrolyze to form silanols that will bind the rock surface and form a coating.

Hydrolysis of the organosilicons is not essentially initiated in the presence of the clay and Hewgill does not teach any intercalation of a reactant into clay galleries.

Therefore, the invention claimed in claim 1 is not anticipated by Hewgill.

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Claims 2 and 5, which depend on claim 1, are not anticipated by Hewgill at least for the same reasons as stated with respect to claim 1.

CONCLUSION

In light of the above amendments and remarks, the Applicants believe that the present application and claims 1-10 are in proper condition for allowance. Such allowance is hereby requested.

Attached hereto are marked-up and clean versions of the claims captioned "**Version with markings to show changes made**" and "**Clean Version of the Claims**" respectively.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW THE CHANGES MADE

Claims 1 and 2 have been amended as follows:

1. (amended) ~~A~~ method of stabilizing a clayey geological formation surrounding a hydrocarbon well comprising the steps of:

injecting from a surface reservoir a fluid comprising a first and a second reactant~~,~~;

letting said fluid contact said clayey formation; and

stabilizing said formation by intercalation of the first reactant into galleries of said clayey geological formation and by using a reaction between said first and said second reactant, wherein said reaction ~~of said first and said second reactant~~ is essentially initiated in the presence of said clayey material.

2. (amended) The method of claim 1, wherein the reaction comprises~~is characterized by substrate intercalation or~~ a condensation stabilization with or without pH adjustment~~, or stabilization through epoxide ring opening under neutral or acidic conditions or substrate in situ polymerization or a combination thereof.~~

Claims 6 and 7 have been added as follows:

6. (new) The method of claim 1, wherein the reaction comprises a stabilization through epoxide ring opening under neutral or acidic conditions.

7. (new) The method of claim 1, wherein the reaction comprises a substrate in-situ polymerization.

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8. (new) The method of claim 1, further comprising the step of:

allowing intercalation of the second reactant into said galleries.

9. (new) The method of claim 1, wherein said reaction takes place inside the clay galleries.

10. (new) The method of claim 1, wherein a reaction product of said reaction is intercalated in the clay galleries.

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CLEAN VERSION OF THE CLAIMS

1. A method of stabilizing a clayey geological formation surrounding a hydrocarbon well comprising the steps of:

injecting from a surface reservoir a fluid comprising a first and a second reactant;

letting said fluid contact said clayey formation; and

stabilizing said formation by intercalation of the first reactant into galleries of said clayey geological formation and by using a reaction between said first and said second reactant, wherein said reaction is essentially initiated in the presence of said clayey material.

2. The method of claim 1, wherein the reaction comprises a condensation stabilization with or without pH adjustment.

3. The method of claim 1, wherein the first reactant is a diamine or a polyhydric alcohol and the second reactant comprises at least one carbonyl group.

4. The method of claim 1, wherein the first reactant is a diamine or a dihydric alcohol and the second reactant comprises at least one carbonyl group.

5. A method of drilling a wellbore into a potentially hydrocarbon bearing formation comprising the steps of drilling part of said wellbore through a clayey formation and using a method in accordance with claim 1 to stabilize said formation.

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6. The method of claim 1, wherein the reaction comprises a stabilization through epoxide ring opening under neutral or acidic conditions.

7. The method of claim 1, wherein a reaction comprises a substrate in-situ polymerization.

8. The method of claim 1, further comprising the step of:

allowing intercalation of the second reactant into said galleries.

9. The method of claim 1, wherein said reaction takes place inside the clay galleries.

10. The method of claim 1, wherein the reaction product of said reaction is intercalated in the clay galleries.

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